

**WHAT IS CLAIMED IS:**

1. A method for optimizing the operation of a plurality of compressor assemblies of a natural-gas compression station, comprising:
  - after start of at least a second compressor assembly, running the rotational speeds of the running compressor assemblies in a fixed rotational speed ratio with respect to characteristic-map data filed for each compressor assembly,
  - thereafter varying the fixed rotational speed ratio by means of an equal-percentage throughflow quantity adjustment via the rotational speed, until surge prevention valves of the natural-gas compression station are closed,
  - thereafter leading the operating points of the compressor assemblies in their characteristic maps toward the maximum efficiency line,
  - thereafter, in a continuous operating mode of the natural-gas compression station, determining optimum rotational-speed desired values by means of a reciprocal mutually coordinated variation of the rotational-speed desired values of the compressor assemblies, taking into account the fuel consumption of the natural-gas compression station, and,
  - on the basis of the optimum rotational-speed desired values determined, adjusting and storing the fixed rotational speed ratio.
2. The method as claimed in claim 1, wherein the operating points of the compressor assemblies in their characteristic maps are led as far as possible toward the maximum efficiency line.

3. The method as claimed in claim 1, wherein sequence control is implemented utilizing an automation program for operating the natural-gas compression station.

4. The method as claimed in claim 1, further comprising transmitting the rotational-speed desired values for the compressor assemblies by a station controller to rotational-speed controllers of the compressor assemblies, wherein the controlled variable used for the station controller is that controlled variable of a plurality of controlled variables that has the lowest positive control deviation.

5. The method as claimed in claim 1, in which at least one of throughflow quantity, suction pressure, final pressure, and final temperature for a natural-gas compression station function as controlled variables for the method.

6. The method as claimed in claim 3, wherein the mutually coordinated variation of the rotational-speed desired values of the compressor assemblies of the natural-gas compression station is carried out by means of an optimization computer arranged between the station controller and the rotational-speed controllers of the compressor assemblies.